

front enclosure and the annular rear enclosure can be by a weld, or the annular front enclosure can be formed in a first injection molding stage after which the annular rear enclosure is injection molded onto the annular front enclosure (or vice versa). In these and other embodiments, the encapsulating structure can comprise an annular front enclosure, an annular back enclosure, an annular inner side enclosure and an annular outer side enclosure and wherein the annular front enclosure and the annular back enclosure are joined to the annular inner side enclosure and the annular outer side enclosure by adhesive. In these and other embodiments, an alignment module can also comprise: a rotational alignment component comprising a rectangular magnet, and the encapsulating structure can hold the rectangular magnet in a fixed position outboard of the annular magnetic alignment component.

[0431] In some embodiments, an alignment module can comprise: an annular magnetic alignment component including a plurality of arcuate magnets; a rotational alignment component comprising a rectangular magnet and disposed outside a perimeter of the annular magnetic alignment component; and an encapsulating structure holding the annular magnetic alignment component and the rotational alignment component in a fixed spatial relationship to each other. Each arcuate magnet can have: an inner arcuate region having a magnetic polarity oriented in a first axial direction; an outer arcuate region having a magnetic polarity oriented in a second axial direction opposite the first axial direction; and a non-magnetized central arcuate region disposed between the inner arcuate region and the outer arcuate region. In these and other embodiments, the encapsulating structure can comprise: a front planar layer; a back planar layer; and a magnet-holding layer, the magnet-holding layer having a circular opening therethrough to accommodate the annular magnetic alignment component and a rectangular opening therethrough to accommodate the rectangular magnet. In these and other embodiments, the magnet-holding layer, the arcuate magnets, and the rectangular magnet can have equal thicknesses, and the magnet-holding layer includes a disc of material filling a region inboard of the annular magnetic alignment component. In these and other embodiments, a first adhesive layer can attach the front planar layer to the magnet-holding layer, and a second adhesive layer can attach the back planar layer to the magnet-holding layer. In these and other embodiments, the front planar layer and the back planar layer can be rectangular layers with rounded corners. In these and other embodiments, the encapsulating structure can have an opening through a region inside an inner perimeter of the annular magnetic alignment component.

[0432] In some embodiments, an alignment module can comprise: an annular magnetic alignment component including a plurality of arcuate magnets, an encapsulating structure surrounding and holding the arcuate magnets in an annular arrangement; and a near-field communication (NFC) coil disposed within the encapsulating structure and coaxial with the annular magnetic alignment component, the NFC coil coupled to an NFC tag circuit. In these and other embodiments, each arcuate magnet can have: an inner arcuate region having a magnetic polarity oriented in a first axial direction; an outer arcuate region having a magnetic polarity oriented in a second axial direction opposite the first axial direction; and a non-magnetized central arcuate region disposed between the inner arcuate region and the outer

arcuate region. In these and other embodiments, the NFC coil can be disposed inboard of the annular magnetic alignment component, and other NFC tag circuit components can be disposed inboard of the annular magnetic alignment component and/or in gaps between certain arcuate magnets of the annular magnetic alignment component. In these and other embodiments, the encapsulating structure can comprise: a front planar layer; a back planar layer; and a magnet-holding layer, the magnet-holding layer having a circular opening therethrough to accommodate the annular magnetic alignment component (and the NFC coil). In these and other embodiments, the magnet-holding layer and the arcuate magnets can have equal thicknesses. In these and other embodiments, the magnet-holding layer can include a disc of material filling a region interior to the annular magnetic alignment component and the NFC coil. In these and other embodiments, an alignment module can further comprise: a rotational alignment component comprising a rectangular magnet and disposed outboard (or outside a perimeter) of the annular magnetic alignment component, and the magnet-holding layer can have a rectangular opening therethrough to accommodate the rotational alignment component.

[0433] Accordingly, although the invention has been described with respect to specific embodiments, it will be appreciated that the invention is intended to cover all modifications and equivalents within the scope of the following claims.

What is claimed is:

1. A wireless charging module comprising:

- a housing having a charging surface and a second surface having an opening therethrough;
- an inductive coil assembly disposed within the housing, the inductive coil assembly including an electrically conductive coil;
- an annular magnetic alignment component disposed within the housing and surrounding the inductive coil assembly, the annular magnetic alignment component including a plurality of sectors, each sector comprising:
 - an inner arcuate region having a magnetic polarity oriented in a first axial direction;
 - an outer arcuate region having a magnetic polarity oriented in a second axial direction opposite the first axial direction; and
 - a non-magnetized central arcuate region disposed between the inner arcuate region and the outer arcuate region; and

control circuitry disposed within the housing, the control circuitry being coupled to the electrically conductive coil and to a plurality of external electrical contacts and being configured to operate the electrically conductive coil to transfer power wirelessly through the charging surface using input power received from the external electrical contacts,

wherein the external electrical contacts are exposed through the opening in the second surface of the housing.

2. The wireless charging module of claim 1 further comprising a conductive midplate disposed within the housing, the midplate having a proximal surface oriented toward the charging surface and a distal surface opposite the proximal surface, wherein the inductive coil assembly is mounted on the proximal surface of the midplate.